

Amendment A
Application No. 10/604,947
Amendment dated June 24, 2004
Reply to Office Action of May 4, 2004
Attorney Docket No. 717664.10

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior revisions, and listings, of claims in the application.

Listing of Claims:

Claims 1 - 10 (Cancelled).

Claim 11 (Currently Amended). A Bishop Process heat exchanger comprising:

_____ at least one elongate inner conduit, at least a portion of which is formed from cryogenically compatible materials;

_____ an outer conduit surrounding at least a portion of the inner conduit, the outer conduit formed from non-cryogenically compatible materials;

_____ a plurality of positioners mounted inside the outer conduit to position the inner conduit generally in a coaxial relationship with the outer conduit to define a generally annular passageway for a warmant;

_____ a warmant pump system to circulate warmant through the annular passageway between the inner conduit and the outer conduit, the warmant selected from the group consisting of seawater, fresh water, and warmants from industrial processes;

_____ a high pressure pumping system to raise the pressure of a LNG in excess of 1200 psig to convert it to a dense phase natural gas (DPNG) and to move the DPNG through the inner conduit;

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the inner conduit formed from a material that is strong enough to withstand the pressures of the DPNG from the high pressure pumping system;

the heat exchanger having a Froude Number in excess of 10 during operation; and

~~The apparatus of claim 6 further including~~ a flexible joint at an end of the inner conduit to facilitate connection of the cryogenically compatible inner conduit with a non cryogenically compatible inner conduit with a non-cryogenically compatible downstream piping system.

Claim 12 (Currently Amended). A Bishop Process heat exchanger comprising:

at least one elongate inner conduit, at least a portion of which is formed from cryogenically compatible materials;

an outer conduit surrounding at least a portion of the inner conduit, the outer conduit formed from non-cryogenically compatible materials;

a plurality of positioners mounted inside the outer conduit to position the inner conduit generally in a coaxial relationship with the outer conduit to define a generally annular passageway for a warmant;

a warmant pump system to circulate warmant through the annular passageway between the inner conduit and the outer conduit, the warmant selected from the group consisting of seawater, fresh water, and warmants from industrial processes;

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a high pressure pumping system to raise the pressure of a LNG in excess of 1200 psig to convert it to a dense phase natural gas (DPNG) and to move the DPNG through the inner conduit;

the inner conduit formed from a material that is strong enough to withstand the pressures of the DPNG from the high pressure pumping system;

the heat exchanger having a Froude Number in excess of 10 during operation;

and

~~The apparatus of Claim 6 wherein~~ the heat exchanger has a serpentine pattern to reduce the overall footprint of the heat exchanger.

Claim 13 (Cancelled).

Claim 14 (Currently Amended). A Bishop Process heat exchanger comprising:

a first section having:
at least one elongate inner conduit, at least a portion of which is formed from cryogenically compatible materials;

an outer conduit surrounding at least a portion of the inner conduit, the outer conduit formed from non-cryogenically compatible materials;

a plurality of positioners mounted inside the outer conduit to position the inner

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conduit generally in a coaxial relationship with the outer conduit to define a generally annular passageway for a warmant;

a first warmant pump system to circulate warmant through the annular passageway in the first section of the heat exchanger;

a second section having:

at least one elongate inner conduit, at least a portion of which is formed from cryogenically compatible materials;

an outer conduit surrounding at least a portion of the inner conduit, the outer conduit formed from non-cryogenically compatible materials;

a plurality of positioners mounted inside the outer conduit to position the inner conduit generally in a coaxial relationship with the outer conduit to define a generally annular passageway for a warmant;

a second warmant pump system to circulate warmant through the annular passageway in the second section of the heat exchanger;

a high pressure pumping system to raise the pressure of a LNG in excess of 1200 psig to convert it to a dense phase natural gas (DPNG) and to move the DPNG through the inner conduit in both the first and second sections of the heat exchanger;

the heat exchanger having a Froude Number in excess of 10 during operation; and

~~The Bishop Process heat exchanger of Claim 13 wherein the high pressure~~

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pumping system including a plurality of pumps each having a nominal pumping rate of 2,200
gpm at a pressure in excess of 1800 psig with total horsepower requirements for the high
pressure pumping system being in excess of 24,000.